

Investigating Flow Features Near Abrupt Topography in the Mariana Basin

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LONG-TERM GOALS

The long term goals of this project are to obtain and interpret new field data on pertinent flow features that arise due the North Equatorial Current (NEC) and/or the North Equatorial Counter Current (NECC) encountering the Mariana Ridge system in the Mariana Basin.

OBJECTIVES

The scientific objective is to use data from regional and process modeling, and pilot field studies, to identify the most likely locations for the generation of pertinent flow features, with examples including lee waves generated by flow over topography and mesoscale eddies generated by flow past islands. Having identified the prime locations in the region for such activity, we will deploy field instrumentation, Pressure recording Inverted Echo Sounders (PIES), to record these processes and compare the field observations with predictions of model data.

APPROACH

First, we will use the MITgcm to perform 2D modeling of flow over transects from three pertinent ridge features. Based on the data from these simulations, and data from other members of the FLEAT DRI, we will select deployment locations for anywhere between five to nine Pressure recording Inverted Echo Sounders (PIES). These PIES will obtain a year-long data set on the processes of interest. Our modeling will help interpretation of the PIES data upon recovery. These activities will be overseen by the PI and mostly performed by the postdoc, Ruth Musgrave. There will be collaborations with Dr. Jae-Hun Park, and potentially Dr. Magdalena Andres.

WORK COMPLETED

The postdoc, Ruth Musgrave, has been appointed and is starting the modeling before officially arriving at MIT in January. The first round of funding has been appropriately directed to the University of Rhode Island (URI), where Prof. Randy Watts will oversee the preparation of three of the PIES for deployment. Two other PIES are prepared and will be shipped to Palau from Korea. Four CPIES are being prepared at URI for Dr. Magdalena Andres, should she become involved in FLEAT. The PI has

also discussed potential FLEAT operations extensively with Prof. Matthew Alford, Prof. Jennifer MacKinnon and Dr. Shaun Johnston.

RESULTS

There are currently no results, as research is only just beginning.

IMPACT/APPLICATIONS

This research will shine new light on regional physical oceanography in the Southwestern Pacific Ocean. In addition, it may support the development of new capabilities for interpreting acoustic data from PIES.

RELATED PROJECTS

None.